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GEOLOGY AND PALEONTOLOGY.

Elevation of America in the Cenozoic Periods.—Mr. W. H. Dall writes as follows to the *Geological Magazine* for May, 1891:

"I notice in recent numbers of the *Geological Magazine* that Mr. Upham has been discussing his views on the elevation of the Gulf of Mexico, etc. It seems a pity that gentlemen who desire to launch such startling hypotheses should not devote more time to settling the facts upon which these hypotheses are based before promulgating their new views. As the statements made by Mr. Upham may be taken as properly verified, and more confusion be thereby occasioned, permit me to call attention to a few facts which have been verified.

"1. The late Dr. Maack, when on the Isthmus of Darien, did not collect any Pleistocene fossils from the summit of the Atrato divide, 763 feet above the sea. 2. The Pleistocene fossils collected by Dr. Maack were from an elevation of only 150 feet on the Panama side, ten miles from Panama City. The fossils above this height collected by Dr. Maack are Eocene or Miocene exclusively, and related to the Miocene fauna of Santa Domingo, as indeed was pointed out by Gabb nearly twenty years ago (Proc. Am. Philo. Soc., Vol. XII., p. 572). 3. The summit or dividing line is not fossiliferous, and is probably not later than the Mesozoic epoch.

"I may add, from information to be shortly published, that the supposed great elevation of Florida at any time since the later Eocene is as improbable as any hypothesis which could well be conceived. The conclusions which the facts necessitate in the case of Florida may be briefly outlined as follows: During the later Eocene, West-Central Florida was an island, like one of the Bahamas at present, composed exclusively of organic marine sediments, which in the Vicksburg epoch attained an unbroken thickness of more than 1,000 feet. The whole submarine plateau above which the present Florida rises may turn out to be of this age and constitution. This island had a land-shell fauna derived from the south. The strait between the island and the main coast north of it was more than fifty miles wide at the narrowest point, and was only closed at the beginning of the Pliocene. There have been gentle changes of level since the Eocene, but nothing violent, and the vertical range has been small. The Eocene and the old Miocene faunas were of a subtropical character, like the Antillean fauna at present. A change took place in mid-Miocene by which a cool, temperate, or colder water fauna invaded the Floridan region from the north, and about 200 feet of strata (Chesapeake Group) were deposited, equivalent to the well-known Miocene beds of Virginia and Maryland. With the elevation which connected the Floridan islands with the continent a warmer era was again inaugurated in the sea, and an invasion of Pliocene vertebrates began on the peninsula of Florida.

"There were unquestionably great changes of level on the continent, increasing as one goes northward, both in Miocene and Pleistocene times. In the Antilles it has been proved that great changes have taken place. But the Floridan region, for some unknown reason, escaped, and Yucatan probably also.

"I have been making a special study of Floridan geology for some years, and hope to publish a considerable amount of new information on that subject during the coming summer."

Discovery of Coal near Dover, England.—In the *Contemporary Review*, April, 1890, Professor W. Boyd Dawkins gives a history of the discovery of coal in Southeastern England. As far back as 1826 Buckland and Conybeare recognized the physical identity of the coal-bearing districts of Somerset on the west with those of Northern France and Belgium on the east. In 1855 Godwin-Austen showed that the general direction of the exposed coal fields in South Wales and Somersetshire and those of North France and Belgium was ruled by a series of folds running east and west parallel to a great line of disturbance centered in the "axis of Artois," and concluded, from a careful study of the region, that there are coal fields beneath the Oölitic and Cretaceous rocks in the south of England, near enough to the surface along the ridge to be capable of being worked. His views were reinforced by Prestwich, in a report made to the Coal Commission of 1866–'71. At length, in consequence of a report made by Mr. Dawkins to Sir Edward Watkin, chairman of the Southeastern Railway and the Channel Tunnel Company, a shaft was sunk on the west side of Shakespeare Cliff, near Dover, to the depth of forty-four feet, and from the bottom of this a bore-hole has been made to the depth of 1,180 feet. The Coal Measures were struck at a depth of 1,204 feet from the surface, and a seam of good blazing coal was met with twenty feet lower. This discovery establishes the fact that there is a coal field lying buried under the newer deposits of Southeastern England, and proves up to the hilt the truth of Godwin-Austen's hypothesis, after a lapse of thirty-five years.

Occurrence of Texas Lignites.—The lignites of Texas occur in the Fayette Beds and Timber Belt Beds of the Tertiary deposits. The borders of this area have been determined and have been fully described by Prof. E. T. Dumble in the Mineral Resources of the United States, 1887, since which time they have not been changed materially by the later investigations. The Fayette Beds underlie the coast clays and other Quaternary deposits of Texas. Their outcrops cross the entire State from the Sabine River to the Rio Grande, and consist of clays, sands, limestones, and pebble deposits. The underlying Timber Belt Beds are composed of siliceous sand and greensand marls, interstratified with clays, generally of a brown color, and thin beds of limestone. The beds of lignite contained in both these series of rocks are very numerous, sometimes occurring in lenticular masses, greater or less extent, thinning out in every direction, and again form extensive seams of considerable thickness, frequently fourteen feet. The Texas Tertiary has been but little disturbed. The force lifting these strata to their present level has caused a gradual and slow elevation, leaving them as originally laid down by the Tertiary sea. However, though no violent volcanic eruptions have distorted these beds, they are nevertheless found sometimes broken, faulted, and bent, caused by the drying and compression of loose, moist underlying deposits. (Second Ann. Rept. on the Iron Ore District of East Texas, 1890.)

The Geological and Natural History Survey of Minnesota.[1]—The report of the Geological and Natural History Survey of Minnesota for 1889 embodies a summary of American opinions on the older rocks of North America by Alexander Winchell, and the record of Mr. N. H. Winchell's field observations in the northeastern part of the state during 1888 and 1889. These observations confirm the views lately set forth by Irving, Bonney, and Samson, and the conclusions published by the reports of the Minnesota survey, to the effect that the Huronian system, as now defined and understood by the Canadian geological reports, really embraces two or three formations; that one of these is the true Huronian, as at first described and mapped by Murray, another is the Keewatin of Dr. A. C. Lawson, containing the iron ores at Tower, Minnesota, and another is the series of crystalline schists which have been styled Vermilion series. These three formations are distinctly separated by lithology and unconformities that have been noted from Vermont to Minnesota, and should no longer be

[1] The Eighteenth Annual Report of the Geol. and Nat. Hist. Surv. of Minnesota, for the year 1889; N. H. Winchell, director.

included under a single term,—at least not under the term Huronian, which at first had a correct and adequate definition, embracing but one of them.

This report gives an idea of the progress that is being made in the intricate geology of the northeastern part of the state, and of the economic resources that are being developed there.

Geological News—Archean.—Mr. Arthur Harvey thinks that the nodules found in the Animikie slates in the region of Thunder Bay are fossil organisms simpler in structure than sponges. In appearance they resembled the puff-balls of our meadows, varying in size from a hen's egg to a coal-scuttle. (Transactions Canadian Inst., March, 1891.)

Paleozoic.—A. Smith Woodward reports two new Devonian fishes, —*Onychodus arcticus*, from Spitzbergen (*Ann. and Mag. Nat. Hist.*, August, 1889), and *Climatius latispinosus*, from New Brunswick (*Geol. Mag.*, November, 1889).——Mr. R. B. Newton has described and figured a new mollusc (*Porcellia latidorsata*) from the Carboniferous limestone of Ireland (*Geol. Mag.*, 1891). Mr. Newton proposes to change the name of Porcellia Lev. to Leveillia, because it resembles the Porcellio of Latreille; an entirely inadmissable proposition.——E. N. Ringueberg has described and figured five new crinoids from the Lower Niagara limestone at Lockport, N. Y. *Callicrinus acanthinus*, *Glyplaster* (*Eucrinus*) *lockportensis*, *Ichthyocrinus conoidens*, *Eucalyptocrinus muralis*. (Annals N. Y. Acad. Sci., July, 1890.)

Mesozoic.—According to A. Smith Woodward, the so-called Creaceous lizard, Raphiosaurus, is founded upon the anterior half of the dentary bone of a characteristic Cretaceous fish, Pachyrhizodus. (*Ann. and Mag. Nat. Hist.*, November, 1889.)——Mr. David White has found Cretacic plants at several points about Gay's Head at Martha's Vineyard. They seem to be nearly related to those of the Middle Cretacic of Greenland, and there is reason to believe them identical with the flora of the Amboy clays. (Bull. Geol. Soc. Am., Vol. I., p. 554.)——Mr. R. T. Hill divides the Comanche series of Texas into several separate and distinct terranes, the lower two of which may possibly be of the pre-Cretaceous age. He gives both stratigraphic and paleontologic proof that such a division is neccessary. (Bull. Geol. Soc. Am., Vol. II. pp. 503–528.)——A new genus of Paleoniscid fishes from the Karoo formation of South Africa has been described by A. Smith Woodward under the name of *Atherstonia scutata*. In appearance of the scales, the situation and proportions of the fins, this

South African fish most nearly approaches Gyrolepis, from the European Trias and Rhætic, and Rhabdolepis, from the European Lower Permian. (*Ann. and Mag. Nat. Hist.*, September, 1889.)

Cenozoic.—Mr. Sirodont has been studying the fauna of a Cenozoic formation at the foot of Mount Dol, on the southeastern side. He is of the opinion that the débris there accumulated belongs to a period anterior to the movement which elevated the shores of certain regions about the Baltic Sea. (*Revue Sci.*, June, 1891.)——Mr. E. Riviere reports the finding of the teeth and bones of *Equus caballus fossilis*, *Bos primigenius*, and a deer as yet undetermined, in the sands of Cergy. (*Revue Sci.*, May, 1891.)——Dr. Reusch has found glacial striæ and boulder clay in Finmark, belonging to a period much older than the "ice age." The ice-marked sandstones are probably Permian, but may belong to the Cambro-Silurian series. (*Geol. Mag.*, May, 1891.)

General.—M. L. Cayeux announces the discovery of an important formation of Diatoms in the tufa which contains *Cyprina planata* in the north of France and Belgium. This tufa results from the agglomeration of sands of the same horizon cemented together by a colloidal or chalcedonis silex. Among the Diatoms which are thus found in great numbers the author cites Synedra, Triceratium, and Coscinodiscus. (*Revue Sci.*, May, 1891.)——Mr. A. Lindenkohl reports a sunken river channel in Chesapeake Bay. A narrow and deep channel can be traced nearly throughout the entire length of the bay, from the mouth of Bush River to that of the Rappahannock, a distance of 120 miles. (*Am. Jour. Science*, June, 1891.)——On his return from Koukou-nor, while crossing the Nau-Chang, Mr. Martin discovered a large band of Jade encased in a rather friable rock. It is true Jade, as fine as that of Siberia, and is worked by the natives to make ornaments, often of great value, for the Chinese. (*Revue Sci.*, May, 1891.)——As to glacial records in the Newark system, Mr. I. C. Russell says that after personally examining nearly every area occupied by it, he fails to find any evidence to support the hypothesis that glaciers assisted in its deposition. (*Am. Journ. Science*, June, 1891.)